**ABSTRACT**

A high data rate, high processing gain, direct sequence spread spectrum system that transmits a BPSK or QPSK signal. The system FEC encodes and interleaves data which are collected and stored and forwarded N bits at a time by transmitting one of $2^N$ pseudo random waveforms every time N bits are collected. The $2^N$ pseudo random waveforms can be sent as an orthogonal, bi-orthogonal, or nearly orthogonal waveform. During acquisition, a plurality of product devices multiply a received spread-spectrum signal by a header chip-sequence signal. In each case, the header chip-sequence signal has a different delay, with each delay being at most one chip. Acquisition can also be achieved using a matched filter. After acquisition, the plurality of product device multiply the received spread-spectrum signal by $2^N$ chip-sequence signals to generate a plurality of products, with each chip-sequence signal of the plurality of chip-sequences signals being different from other chip-sequence signals of the plurality of chip-sequence signals; a plurality of integrators integrate the plurality of products thereby forming $2^N$ correlators, and a comparator selects a largest value from the plurality of integrators. The largest value is decoded into N bits of data. This process is repeated for each N bit word received.

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